



RIS Roof and Building Integrated Solar PV System



Panels and mounting system produced in the UK
Over 20 years of installations in the UK and beyond
10 year durability warranty on whole system
25 year performance warranty on all panels
Shaped and bespoke systems to order



Introduction

In 1994, GB Sol designed the first Roof Integrated System in the UK. Since then, RIS has been used in many landmark installations, including the Oxford Eco House that has featured in green-construction bench-marking publications.

The system replaces traditional roofing materials providing a significant contribution towards the solar array's costs as well as creating an aesthetically pleasing solution.

BRE Tested

The RIS system has undergone stringent testing in the BRE wind tunnel, simulating hurricane conditions. For over 20 years the system has proven itself in many countries and in various arduous locations.

Since the Oxford Eco House (top right) was completed in 1995, our solar panels have continued to evolve and now black laminates are the preferred specification. The externally visible elements of the mounting system are powder coated RAL9005 satin black although any RAL colour can be supplied on request. The system has been tested and complies with the requirements of MCS012.

Award Winning Product

In 2013 "Treleigh House" won the prestigious Solar Power Portal Award for the 'domestic rooftop installation up to 10kW' (pictured to the right). The judges said that **"the winning project was "superb" with its ability to deal with a set of complex requirements, multi-faceted roofs and a solar array able to integrate with a number of other energy efficient technologies, the installer responsible really did maximise their experience, creating a truly bespoke system: an out and out winner."**

Concept and Installation

The RIS system uses GB-Sol solar panel laminates (frameless) which are fitted onto the RIS framework during installation. This ensures a perfect seal without the need to install extra plastic membranes under the array and as used by other in-roof systems.

As each panel is supplied complete with EPDM edge gaskets, there are no further membranes required to complete the sealing of the roof other than that you will find on a conventional tiled roof.

The recycled aluminium mounting system framework has channels to remove condensation and to provide back-up drainage in the unlikely event the gasket is compromised. The system uses panels up to 360Wp to provide sizing options for aesthetics, fit and efficiency.

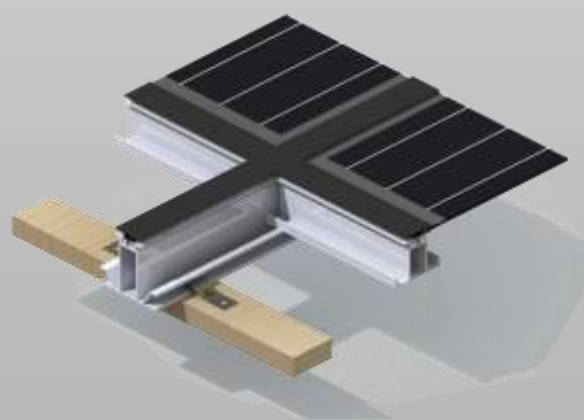
Once a roof is at its normal membrane level, the RIS system can be fitted directly to the battens, or decking, using the standard fixings provided. When the framework is in place, solar PV laminates are added and the cap/sealing strips are riveted in place; retaining the panels by compressing the gaskets to form a perfect seal. Rivets are used as they do not work loose and are very easy to remove if any element is damaged and needs replacing.

Installation time is therefore less than a conventional over-tile system.

The flashings are powder coated aluminium and are also riveted to the mounting rails. We supply a standard flashing set but some bespoke requirements have versions designed specifically for the roof concerned.



Assembled Schematic



Design and Pricing

The GB-Sol design service is included and can be undertaken on receipt of some basic facts:

- Roof size and orientation (Width, Length of ridge to eaves, pictures help and/or Google Earth reference)
- Any obstructions (Velux, dormer, aerials or other shading) with specific location
- Portrait/Landscape (although we would prefer the option to design with either)
- Roof type (Tile, slate, etc) for flashing compatibility
- Powder Coated frame (yes / no. It will be black unless a RAL reference is quoted)
- Distance from panels to inverter
- Angles of any non rectangular elements
If with electrics
- Single or three phase supply
- Inverter (if you have a preference)
- Number of inverters and strings (or leave it to us)
- G59 Kit required (yes /no)



Alternatively simply give us a call. See also our survey and design guide downloadable from our website.

Bespoke shaped panels

Not all roofs are dimensioned in multiples of solar panels nor are standard triangular panels going to match the various angles to be found on a roof so GB-Sol can adjust the panel sizes to ensure the array size matches your needs.

GB-Sol can manufacture panels to compliment the standard rectangular array and to fill a roof either surrounded by tiles as shown above or as a complete roof flashed to fit as shown in examples elsewhere in this brochure.

What is supplied?

Once the above details are known, we will respond with a detailed quotation, showing the array size and also the dimensions of the array plus its flashings. If the array is full roof width, the flashing detail is amended accordingly. Sometimes it is easier to design and install the flashings once the array is complete.

Flashings for more complex layouts are also available. But if you are in any doubt please contact us for more information or possibly site help.

If preferred, the system can be flashed with zinc or lead and we are happy to liaise with these specialist trades.

Standard Panel Options

GB-Sol now manufacture a full range of MCS accredited panels including:

Power Range	Dimensions
120W - 150W	1.305m x 0.655m
150W - 170W	1.452m x 0.655m
200W - 225W	1.322m x 0.981m
225W - 255W	1.478m x 0.981m
250W - 285W	1.633m x 0.981m
340W - 380W	1.633m x 1.297m



(see page 7 for data on 250W versions).

Panels can also be produced with clear back sheets if mounting where natural light is required. As well as dimension 'adjustment' to ensure the array fits the roof.



Installation

The RIS kit will be supplied to your site complete and ready for installation along with an installation guide and dimensioned drawing of your specific array.

All parts will be of the correct dimensions to fit the agreed design so you do not have to cut any rails or drill any holes. This will all be completed for you. The exception is for the flashings as holes will have to be drilled in the main rails to allow for minor differences with the roof tolerances.

Flashings are predrilled to provide a guide for these hole positions .

The main rails (vertical) are attached to the roof battens using the clips provided. The clips are spring loaded and will allow the system to expand and contract with changing temperatures without compromising the integrity or the positioning of the array on the roof.

The cross rails are then riveted to the main rails again using pre-drilled holes.

Flashings

The flashings can then be fitted to the array. These are riveted to the corresponding main (vertical) and cross (horizontal) rails. Experience has shown that drilling the rivet holes in the main rails on site is better than trying to line up two very slightly mismatching holes caused by differing site tolerances.

Tiles can be fitted around the array either now or after the laminates are installed.

If the array is not mounted from the gutter level, as shown in the examples pictured, then a simple lead flashing should be installed by the roofer prior to fitting the array.

Laminate Panels

The laminate panels are placed onto the frame to be sealed and kept firmly in place by the cap strips, which are also pop riveted into place. By inserting the supplied setting blocks into the slots provided in each rail, the panels can easily be perfectly aligned with the panels alongside, above and below.

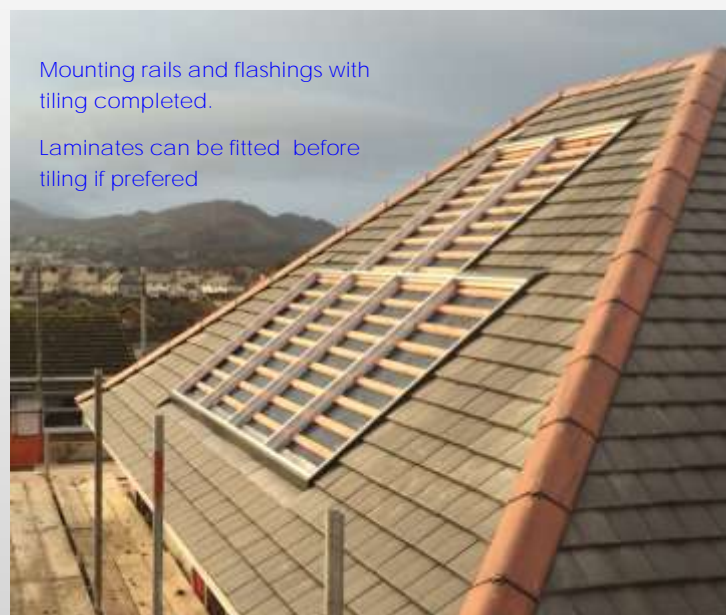
Each laminate is provided with an EPDM gasket already fitted at the factory.

The pop rivets provided are proven and tested not to loosen as may be the case with systems using threaded or self-tapping screws. After twenty years of installations the systems build quality performance and integrity are well proven.

See installation guide accompanying the kit or downloadable from our website.

Facades

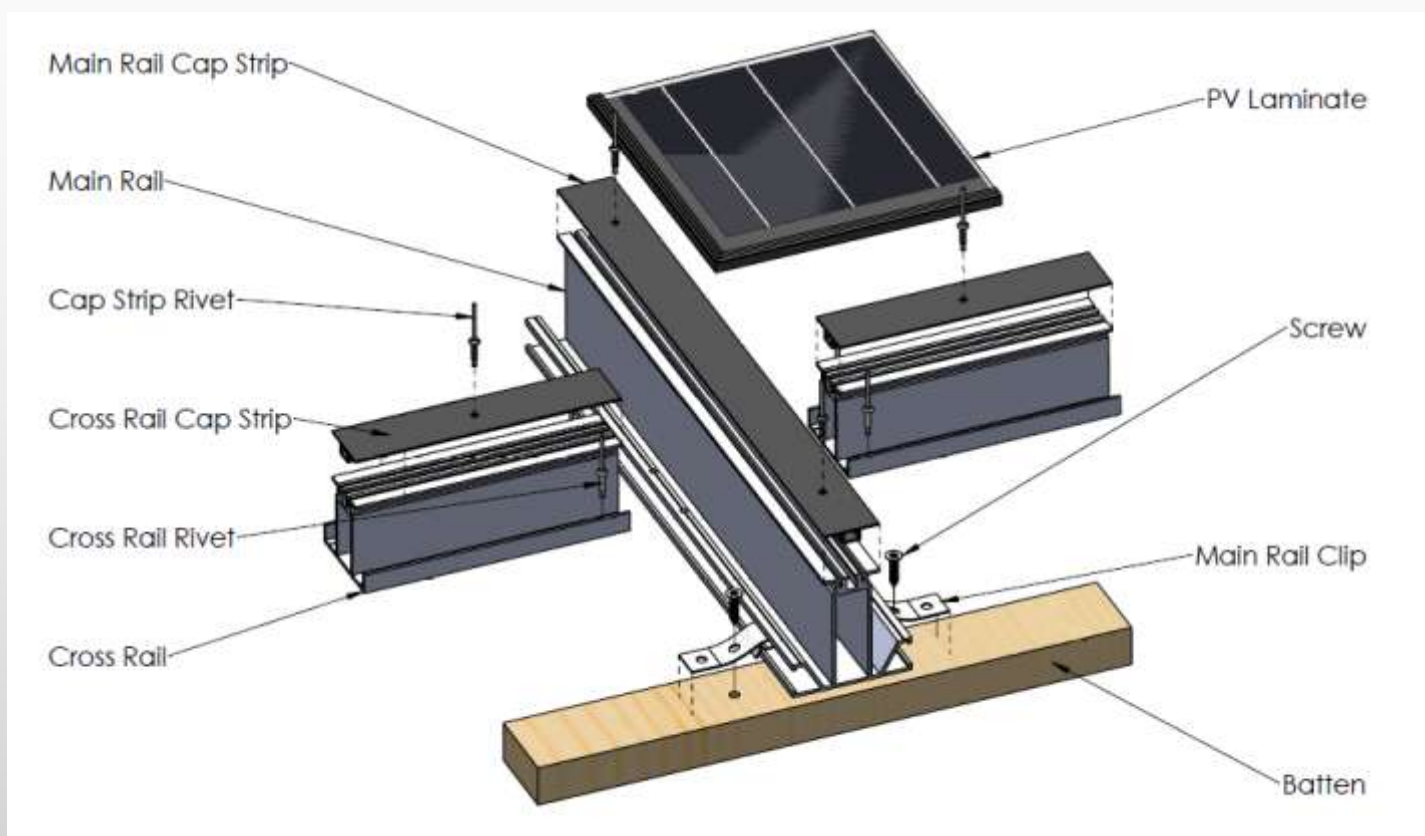
The RIS system can be mounted at any angle, although occasional cleaning maybe required below 15° from horizontal. A vertical version (FIS) using a suitable mounting bracket system is also available.



Exploded View

The exploded view below shows clearly how the system is assembled using a rivet gun. Due to the number of rivets in the system we recommend the use of a battery rivet gun that retains the disposable element of the rivet and has no trailing leads or pipes (pneumatic) for ease of use on a roof.

GB-Sol can recommend a product or provide one on a hire basis (stock allowing). Most Tool Hire companies provide the riveters but not necessary the correct length nose extensions to access the cross rail rivets, be sure to check suitability. If in doubt contact us for advice.



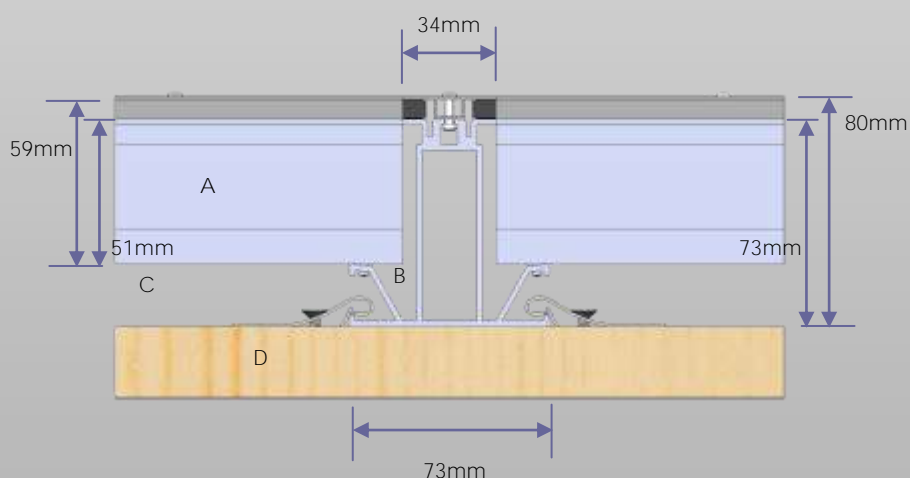
Ventilation

The RIS system is designed to allow air to naturally circulate up the array by passing through the gap (C) above the wooden battens (D) and under the cross rails (horizontal) (A). If the installation does not have a minimum of two rows of roof tiles between the ridge and the top of the array, then a ventilated ridge tile is recommended to allow the air flow to exhaust.

Back Up Drainage

In the unlikely event an EPDM gasket is damaged or should condensation build up on the underside of the panel all moisture will naturally run into the drainage channel (B) and is carried down to the gutter below the array.

If installed with tiles below the base of the array a lead apron over the top of this row of tiles and under the edge of the array will be needed to be provided by the roofer.



Solar Panel Laminates

The RIS system can be configured to take any size of GB-Sol solar PV Panel laminates providing more flexibility in design due to the reduced physical size compared with larger framed panels. Other benefits this provides includes easier handling and speedier installation on the roof as well as providing a more aesthetically pleasing appearance.

Most of our designs use the GB-Sol 250-285W panels, however we have a wide selection of sizes produced in our UK factory up to 360W. We select from our full range of sizes when designing a suggested array layout.

Warranty Minimum 80% output in 25 years.

Typical Characteristics			
	250W	260W	285W
Maximum Power (Pmax) (W)	250	260	285
Voltage at Max Power (Vmp)	32.5	33.0	33.0
Current at Max Power (Imp)	7.8	8.0	8.76
Voltage at open Circuit (Voc)	38.3	39.3	39.36
Current at short circuit (Isc)	8.2	8.2	9.33
Cell Efficiency (%)	19.2	20	20.4
Panel Efficiency (%)	15.48	16.10	17.8
Temp. Co-eff. Current (%/C)		0.05	
Temp. Co-eff. Voltage (%/C)		-0.33	
Temp. Co-eff. Power (%/C)		-0.42	
Operating Temperature		-40° +85° C	
Bypass Diodes		3	
Dimensions	Framed: 1638 mm (L) x 986mm (W) x 35mm (D) Laminate (w/Gasket): 1632mm (L) x 981mm (W) x 6mm (D) Junction box 25mm		
Weight	28kg (framed version)		
Quality	Manufactured in our ISO 9001-2015 and ISO 14001 certified factory. Complies with TUV SUD accreditation, IEC 61215 and IEC 61730 MCS accredited BABT 8501		



Appearance

All GB-Sol panels are now manufactured with hidden horizontal bus-bars and they only have a minute discrete front label so maximising the 'black' appearance.

The RIS system can be supplied in aluminium mill finish or powder coated to match or as specified.



Products are under continuous development so some specifications may be subject to change



RIS Flashings

GB-Sol RIS kits are supplied complete with all the roof flashings required for each project. As standard, the kits are supplied with flashings designed for a mid-roof installation; with tiles or slates on all four sides.

Side flashings are designed to overlap providing infinite overall length so there is no requirement to 'cut to fit' on site as with other in-roof systems on the market although a bead of silicone at flashing overlap is advisable

We have standard designs for many roof configurations and also produce bespoke versions for more complex designs.



Supply Options

RIS is supplied as a kit including mounting rails, PV panels, flashings and fixings including rivets, screws and clamps. All elements of the mounting system that are visible externally are powder-coated black although other RAL colours can be supplied on request.

The kits can also be provided complete with inverters and all elements of the electrical system and wiring configuration.

(Kits exclude lead flashings shown above).



Other examples of the versatile RIS system



FIS and Facades

GB-Sol also produces bespoke panels and a popular requirement is for facade or Brise-Soleil shading applications using our RIS in its vertical facade form (FIS).

The panels can be installed using our FIS system or other suitable proprietary glazing or curtain walling systems.

The picture to the right shows an end wall facade. There is a 30% output reduction in vertical arrays but this has facilitated a PV option on a property where a conventional roof mounted layout was not a permissible option.

The panels can be in standard laminate form, transparent back design, glass front and using different mounting systems glass rear (glass/glass) transparent forms. We can even supply them as a double glazed module to replace standard double glazed units to fit other window systems.

